In chronic cases there is exacerbation of the characteristic symptoms on exertion, cough and frequently on deep inspiration.

TREATMENT. In the acute cases the treatment is that of any pleuritis. We have found that cold applications, in the form of iced-linen strips, applied (and frequently changed) to the affected side for two hours, is most efficacious. Of course, sedatives are used when necessary. Strapping the lower chest and upper abdomen seems to give the greatest relief, and many of our chronic cases return to us asking that their sides be strapped. They have found that after the side has been strapped their pains will be relieved almost immediately and that they will be free from their annoying symptoms for from several weeks to months.

We are indebted to Mr. R. Isaacs for the accompanying charts.

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THE FRACTIONAL EXAMINATION OF THE DUODENAL CONTENTS.[1]

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THE duodenal contents are of intrinsic value for the welfare of the organism. The main process of digestion is accomplished by the proper working and correlation of the different fluids entering into this comparatively small part of the digestive apparatus (the duodenum). It is quite natural that a study of these secretions from every possible viewpoint will prove useful physiologically as well as pathologically.

In several previous communications I published my results concerning the examination of the duodenal contents. Usually these explorations of the duodenal secretions had been done either in the fasting condition of the patient or some time after the ingestion of either tea and sugar or bouillon. No particular attention had been paid as to the length of time after the meal the examination had been performed.

It appeared to me worth while to undertake a comparative study between the results of the examination in the fasting condition and at different periods after certain test meals. Inasmuch as the duodenal tube must have a comparatively narrow lumen, solid food, even mechanically well comminuted, would be apt to clog up the instrument, and would therefore be inappropriate for these examinations.

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[1] Read before the Association of American Physicians, at Atlantic City, N. J. May, 1918.

For these reasons I had already formerly employed either tea and sugar or bouillon as preparatory meals.

In the present investigation I selected a cup of beef bouillon (one bouillon cube, usually Armour & Co., to one cup of hot water) as the proper test meal. Beef being a strong stimulant for the digestive secretions seemed to answer well our purpose.

Examination of the duodenal contents was first made in the fasting condition, then a cup of beef bouillon was given by mouth and the duodenal contents aspirated every half-hour for a period of two hours (fractional examination).

In order to have a larger collection of cases, we utilized many patients who were on duodenal alimentation or duodenal fluid instillation for this purpose. In these cases the explorations can be carried out with the greatest ease, for they have the tube already in the right place. But we also took patients not accustomed to the tube, principally in conditions in which the bile or pancreatic secretions had to be examined any way. We also had two persons without any subjective symptoms, representing the normal, who were willing to undergo this examination for the benefit of science (George C. and Miss Ruth M., to whom I express my thanks for coöperation).

In all these additional cases the mode of procedure was as follows: The patient was given the duodenal tube in the evening after a light supper. Attention was paid to the length of tube which had entered the buccal cavity before retiring. Mark III of the tube should have reached the mouth; if not, the patient is given milk or water and the tube in this way made to go in beyond the III mark before going to sleep. In patients who sleep restlessly it is advisable to attach the tube, lying outside the mouth, with a piece of adhesive plaster to the cheek, in order to avoid a pulling out of the instrument during the night by any inadvertent motion. In the early morning the capsule end of the tube has usually reached the duodenum and the desired examination can be performed.

The specimens obtained were examined within one or two hours after aspiration. The quantity and appearance of the fluid, in regard to color and clearness, then the reaction, whether neutral, alkaline or acid, and the figure of alkalinity or acidity, were ascertained. For the reaction, blue and red litmus paper was used, while the degree of alkalinity was determined by titration, with methyl-orange and $\frac{1}{10}$ standard solution of hydrochloric acid. The ferments (amylopsin, steapsin and trypsin) were estimated by employing agar tubes[2] and gauging the amounts by the digested piece of the agar column, stated in millimeters. I am greatly obliged to Dr. O. Hensel for having examined seven specimens from my cases.

Altogether, I have examined the duodenal contents of thirty-two people with the fractional method. In all the bouillon test meal was used; in most of the patients the duodenal contents were also examined in the fasting condition. It will be best to first give the results of these examinations in table form.

REMARKS. The table on pages 820–826 begins with two apparently normal individuals (Group I). In Case 1, R. M., the alkalinity of the duodenal contents in the fasting condition is 30 while one-half hour after the bouillon test meal it is only 10, then it goes to 25, 25 and ultimately to 30. The ferments, likewise, are strongest in the fasting condition while they are weakest one-half hour after the test meal, to increase in strength later on.

Case 2, also belonging to the apparently normal, shows already a different relation. Here the alkalinity in the fasting condition is 20; half an hour after the test meal it is the same. The ferments in the fasting condition are weaker than half an hour after the bouillon; one hour after the test meal they are strongest while later the steapsin ferment grows weaker.

Group II. Five cases with normal gastric secretion, HCl+, acidity 60. In A. M., R. S. and J. M. W. the alkalinity increases up to the end of the first hour, it then slightly diminishes. In Mrs. T. T. and W. B. the alkalinity shows a steady increase up to the end of the two hours.

The ferments show great variations, but, on the whole, their strength, on an average, is greatest about one hour after the bouillon test meal.

Group III. Eleven cases of hyperchlorhydria, in three of which the fasting duodenal contents were examined, show in two a slightly diminished alkalinity one-half hour after the bouillon test meal, while in one there was apparently no difference.

The figures of the alkalinity fluctuated between 5 and 40 and were usually highest between one hour and one and a half hours after the bouillon test meal. The ferments, likewise, showed, in a general way, the same peculiarity, being strongest about that time.

Group IV comprises 4 cases of subacidity and 1 of cholelithiasis, with unknown gastric secretion. The degree of alkalinity fluctuated between 10 and 35; once it was 70 and once in the same patient, with the biliary fistula, it was found to be acid or −10. The strength of the ferments was usually highest between one and a half hours after the bouillon test meal.

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[2] **Einhorn, Max: Agar Tubes for the Estimation of the Pancreatic Ferments, Med. Record, January 15, 1910; also Recent Studies of Pancreatic Secretions, Med. Record, January 12, 1915.**

TABLE OF CASES IN WHICH FRACTIONAL EXAMINATIONS OF THE DUODENAL CONTENTS WERE MADE.

No.	Name.	Diagnosis.	Gastric contents.	Date and time.	Duodenal contents.					Remarks.
					Quantity and appearance.	Alkalinity.	Amylopsin.	Steapsin.	Trypsin.	
				Group I.						
				March 3, 1918						
1	Miss R. M.	Apparently normal	½ h. a. b., HCl+; ac., 30 1½ h. a. b., HCl+; ac., 40	Fasting	1½ c.c.; yellow; turbid	30	8	5	5½	
				½ h. a. b.	2 c.c.; straw yellow; slightly turbid	10	4	1	1	
				1 h. a. b.	2 c.c.; yellow; golden tinge; slightly turbid	25	7	3	5	
				1½ h. a. b.	2 c.c.; yellow; turbid	25	6½	4	5	
				2 h. a. b.	2½ c.c.; yellow; slightly turbid	30	7	4	5½	
				Mar. 17, 1918						
2	Mr. G. C.	Apparently normal	½ h. a. b., HCl+; ac., 50	Fasting	4 c.c.; yellow, very slightly turbid	20	7	Tr.	6	
				½ h. a. b.	6 c.c.; golden brown and clear	20	10	2	7	
				1 h. a. b.	4 c.c.; golden yellow and clear	25	12	2	6	
				1½ h. a. b.	3 c.c.; straw yellow and clear	20	9	1	5	
				2 h. a. b.	6 c.c.; golden yellow	35	12	1	7	
				Group II.						
				Feb. 21, 1918						
:	Mr. A. M.	Cholecystitis; chronic appendicitis	HCl+; ac., 60	Fasting	3 c.c.; turbid; green, yellow	20	10	25	4	
				½ h. a. b.	3 c.c.; turbid; green, yellow	20	9	4	5	
				1 h. a. b.	3 c.c.; yellow; slightly turbid	30	4	0	Tr.	
				1½ h. a. b.	2½ c.c.; yellow; very slightly turbid	10	5	Tr.	1	
				2 h. a. b.	2½ c.c.; clear; straw colored	10	4	Tr.	3	

				Feb. 5, 1918					
4	Miss R. S.	Nervous regurgitation	HCl+; ac., 60	½ h. a. b.	6 c.c.; yellow	5	0	½	½
				1 h. a. b.	6 c.c.; yellow	15	4½	1½	2½
				1½ h. a. b.	2 c.c.; yellow	10	6	1½	1
				2 h. a. b.	1½ c.c.; yellow	10	0	1	Tr.
				Oct. 30, 1917					
5	Mr. J. M. W.	Duodenal ulcer	HCl+; ac., 60	½ h. a. b.	Yellow; cloudy	40	5	½	Tr.
				1½ h. a. b. (boiled)	Yellow; cloudy	40	0	0	0
				1 h. a. b.	Watery; yellow	50	6	2	2
				1½ h. a. b.	Light; yellow	40	10	6	5
				2 h. a. b.	Light; yellow	40	8	4	4
				Oct. 27, 1917					
6	Mr. T. T.	Gastric ulcer	HCl+; ac., 60	½ h. a. b.	Cloudy	10	0	Tr.	Tr.
				1 h. a. b.	Clear	10	7	2	2
				1½ h. a. b.	Clear	15	7	5	6
				2 h. a. b.	Turbid	25	4	2	Tr.
				Mar. 9, 1918					
7	Mrs. W. B.	Gastric ulcer	½ h. a. b., HCl+; ac., 40	½ h. a. b.	4 c.c.; yellowish-green tinge; turbid	15	8	2	4
			1 h. a. b., HCl+; ac., 60	1 h. a. b.	1 c.c.; yellow; slightly tubid	20	8	3	3½
				1½ h. a. b.	½ c.c.; yellow; slightly turbid	25	7½	7	4
				2 h. a. b.	1 c.c.; straw yellow; slightly turbid	25	10	7	5
				GROUP III.					
				Feb. 10, 1918					
8	Mrs. J. T. P.	Cholecystitis; gastric ulcer	HCl+; ac., 65	Fasting	7½ c.c.; yellow; turbid	40	20	7	4½
				½ h. a. b.	7 c.c.; yellow; turbid	20	12	3	2
				1 h. a. b.	5½ c.c.; yellow; turbid	35	6	2½	4
				1½ h. a. b.	5 c.c.; reddish tinge; sediment	40	5½	1	4
				2 h. a. b.	8 c.c.; light yellow; sediment	40	15	1	5
				Sept. 17, 1917					
9	Mr. C.	Duodenal ulcer	HCl+; ac., 70	½ h. a. b.	6 c.c.; golden yellow	15	6	1½	1½
				1 h. a. b.	7 c.c.; golden yellow	20	6	3	4
				1½ h. a. b.	2 c.c.; golden yellow	25	5	1	2
				2 h. a. b.	4½ c.c.; golden dark	30	6	5	5

h. a. b. = hour(s) after bouillon.

TABLE OF CASES IN WHICH FRACTIONAL EXAMINATIONS OF THE DUODENAL CONTENTS WERE MADE—*continued.*

No.	Name.	Diagnosis.	Gastric contents.	Date and time.	Duodenal contents.					Remarks.
					Quantity and appearance.	Alkalinity.	Amylopsin.	Steapsin.	Trypsin.	
			GROUP III	—Continued						
				Sept. 30, 1918						
10	Mr. P. D.	Duodenal ulcer	HCl+; ac., 72	½ h. a. b.	Pale green	17½	8	½	1	
				1 h. a. b.	Yellow, green	22½	9	1	1½	
				1½ h. a. b.	Green	10	6	½	1½	
				Mar. 17, 1918						
11	Mrs. L. M.	Enteroptosis; hyperchlorhydria	HCl+; ac., 80	Fasting	1 c.c.; green; turbid	20	8	4	5	
				1 h. a. b.	5 c.c.; greenish yellow; clear	30	7	3	3	
				1 h. a. b.	1 c.c.; yellow, tinge of green; clear	20	9	Tr.	5½	
				1½ h. a. b.	2 c.c.; yellow, tinge of green; clear	30	8	1	6	
				2 h. a. b.	2 c.c.; yellowish green; slightly turbid	25	8	2	6	
				Nov. 21, 1917						
12	Mrs. E. W. G.	Gastric ulcer	HCl+; ac., 80	½ h. a. b.	Turbid	0	0	0	0	
				1 h. a. b.	Turbid	10	5	1	0	
				1½ h. a. b.	Green; turbid	12½	6	1½	2	
				2 h. a. b.	Green; turbid	12½	5	1	1	
				Sept. 27, 1917						
13	Mr. W. E.	Gastric ulcer; nephrolithiasis	HCl+; ac., 80	½ h. a. b.	Colorless; clear	0	0	0	0	
				1 h. a. b.	Yellow; turbid	15	8	½	1	
				1½ h. a. b.	Green; turbid					
				2 h. a. b.	Green; turbid	10	10	½	1	
				Oct. 4, 1917						
14	Mr. I. O.	Gastric ulcer	HCl+; ac., 90	½ h. a. b.	Light yellow	2	3	1	1	
				1 h. a. b.	Light yellow	10	5	1½	1½	
				1½ h. g. b.	Green	15	6	1½	1	
				2 h. a. b.	Green	15	3	½	½	
				Jan. 18, 1918						
15	Mr. M. S.	Gastric ulcer	HCl+; ac., 90	½ h. a. b.	2 c.c. gold yellow	10	2½	1	3	
				1 h. a. b.	4 c.c. gold yellow; clear	20	5	2	2	
				1½ h. a. b.	3 c.c. gold yellow; clear	20	5	2	3	
				2 h. a. b.	2 c.c. gold yellow; clear	10	7	2	2	

16	Mr. W. F. Mc.	Duodenal ulcer	HCl +; acidity, 90	Sept. 19, 1918						
				½ h. a. b.	Yellow	20	4	1	5	
				1 h. a. b.	Colorless	25	3	1		
					Colorless	..	3½	½	2	
					Colorless	..	3			
17	Mr. C. M. D.	Duodenal ulcer	HCl +; ac., 90	Feb. 28, 1918						
				Fasting	½ c.c.; whitish; turbid	..	0	Tr.	Tr.	
				½ h. a. b.	1 c.c.; turbid; yellowish tinge	..	9	1½	2	
				1 h. a. b.	1 c.c.; slightly yellow; turbid	..	5	4	2½	
				1½ h. a. b.	3 c.c.; yellowish-green tinge; slightly turbid	20	8	4	5	
				2 h. a. b.	4 c.c.; yellowish green	30	11	1½	8	
18	Mrs. H. McR.	Pyloric ulcer	HCl +; ac., 96	Feb. 9, 1918						
				Fasting	4 c.c.; yellow; turbid	20	6½	5½	3	
				½ h. a. b.	5 c.c.; yellow; turbid	15	5½	2½	2½	
				1 h. a. b.	2 c.c.; yellow; turbid	20	9	6	3	
				1½ h. a. b.	1¾ c.c.; yellow; turbid	30	6½	2	4	
				2 h. a. b.	3½ c.c.; yellow; turbid	30	6½	2½	2	
				GROUP IV.						
19	Mr. J. D.	Duodenal ulcer	HCl +; acidity 35	Mar. 12, 1918						
				Fasting	6 c.c.; yellow; turbid	35	5	1	4	
				½ h. a. b.	4 c.c.; yellow; turbid; greenish tinge	30	10	2	4½	
				1 h. a. b.	6 c.c.; straw colored; very slightly turbid	35	9	2½	4	
				1½ h. a. b.	2 c.c.; yellow; very slightly turbid	30	6	1	2	
				2 h. a. b.	3 c.c.; yellow; very slightly turbid	30	7	1½	5	
20	Mr. M. S.	Probable cholelithiasis; chronic gastric catarrh	HCl +; ac., 35	Feb. 23, 1918						
				Fasting	6 c.c.; yellow, green; turbid	15	8	1½	Tr.	
				½ h. a. b.	6 c.c.; yellow, green; turbid	20	14	7	Tr.	
				1 h. a. b.	½ c.c.; straw yellow	..	10	4	4	Urobilinogen not present.
				1½ h. a. b.	¼ c.c.; yellow; clear	..	6	1	1	
				2 h. a. b.	¼ c.c.; yellow	..	Tr.	Tr.	Tr.	

h. a. b. = hour(s) after bouillon.

TABLE OF CASES IN WHICH FRACTIONAL EXAMINATIONS OF THE DUODENAL CONTENTS WERE MADE—*continued.*

No.	Name.	Diagnosis.	Gastric contents.	Date and time.	Duodenal contents.					Remarks.
					Quantity and appearance.	Alkalinity.	Amylopsin.	Steapsin.	Trypsin.	
			GROUP IV	—Continued						
				Mar. 10, 1918						
21	Dr. F. W. H.	Gastric catarrh	HCl?; ac., 20	Fasting	15 c.c.; greenish; turbid	Ac.	0	0	0	Probably from the stomach.
				½ h. a. b.	10 c.c.; turbid; greenish tinge	Ac.	0	0	0	
				1 h. a. b.	6 c.c.; yellow; clear	20	8	Tr.	3	
				1½ h. a. b.	4 c.c.; yellow; clear	15	8	2	5	
				2 h. a. b.	6 c.c.; straw yellow; slightly turbid	10	6	1	3	
				Mar. 23, 1918						
22	Mrs. W.	Cholelithiasis	......	Fasting	8 c.c.; golden yellow; very slight turbidity	10	11	3	5½	
				½ h. a. b.	8 c.c.; straw yellow; very slight turbidity	12	9	2	6	
				1 h. a. b.	10 c.c.; light yellow; turbid	12	8	3	6	
				1½ h. a. b.	6 c.c.; yellow; greenish tinge; clear	10	11	6	5	
				2 h. a. b.	7 c.c.; yellow; clear; greenish tinge	12	13	3	4	
				Feb. 19, 1918						
23	Mrs. A. L. M.	Biliary obstruction and fistula	HCl +; ac., 40	Fasting	1 c.c.; yellow; turbid	15	5	Tr.	Tr.	
				½ h. a. b.	2 c.c.; yellow; turbid	20	5	1½	1	
				1 h. a. b.	3 c.c.; yellow; turbid	20	7	1½	Tr.	Pancreatic rennet +.
				1½ h. a. b.	6 c.c.; clear	70	16	2		
				2 h. a. b.	7 c.c.; yellow; turbid	−10	Tr.	Tr.	Tr.	Free acid present.
				GROUP V.						
				Feb. 23, 1918						
24	Mr. J. M. M.	Achylia gastrica; probable cholelithiasis	HCl, 0; neutral	Fasting	2 c.c.; yellowish green; slight turbidity	20	6	Tr.	1	
				½ h. a. b.	6 c.c.; brownish yellow; very slightly turbid	30	17	8	10	

				1 h. a. b.	1½ c.c.; yellow; very slightly turbid	20	5	2	1½	Urobiligen not present.
				1½ h. a. b.	2 c.c.; yellow; slightly turbid	40	11	Tr.	2	
				2 h. a. b.	2 c.c.; very slightly turbid	30	8	1	1	
				Mar. 24, 1918						
25	Mr. S. E.	Chronic myelitis; achylia gastrica	HCl, 0; ac., 0	Fasting	10 c.c.; yellow; turbid	35	12	1	5	
				½ h. a. b.	10 c.c.; yellow; greenish tinge; turbid	30	14	1	5	
				1 h. a. b.	½ c.c.; straw yellow; slightly turbid	20	9	3	6	
				1½ h. a. b.	1 c.c.; golden yellow; clear	25	11	2	4	
				Mar. 8, 1918						
26	Mr. A. A. C.	Carcinoma of the stomach	HCl, 0; ac., 25	Fasting	4½ c.c.; milky; turbid	50	8	2	Tr.	
				½ h. a. b.	6 c.c.; yellow; turbid; sediment	55	11	6	4	
				1 h. a. b.	6 c.c.; light yellow; turbid; greenish sediment	60	10	5	6	
				1½ h. a. b.	5 c.c.; greenish yellow and sediment	60	10	3	4	
				2 h. a. b.	1 c.c.; greenish yellow and sediment	60	9	Tr.	3	
				GROUP VI.						
				Jan. 12, 1918						
27	Mr. O. H.	Diabetes mellitus; thrombo-angiitis obliterans	......	½ h. a. b.	Yellow; clear	20	6	12	2	
				1 h. a. b.	Yellow; clear	24	10	5	3	
				1½ h. a. b.	Yellow; clear	10	12	5	6	
				2 h. a. b.	Yellow; clear	20	6	1	2	
				Mar. 15, 1918						
28	Mr. C.	Thrombo-angiitis obliterans	......	Fasting	4 c.c.; yellow; turbid	15	6	1	2	
				½ h. a. b.	½ c.c.; yellow; turbid	..	7	0	3	
				1 h. a. b.	5 c.c.; greenish-yellow; turbid	20	14	5	3	
				1½ h. a. b.	1 c.c.; yellow; greenish; slight turbidity	30	8	2	4	
				2 h. a. b.	¼ c.c.; yellow	..	8	0	3	

h. a. b. = hour(s) after boullion.

TABLE OF CASES IN WHICH FRACTIONAL EXAMINATIONS OF THE DUODENAL CONTENTS WERE MADE—*continued.*

No.	Name.	Diagnosis.	Gastric contents.	Date and time.	Duodenal contents.					Remarks.
					Quantity and appearance.	Alkalinity.	Amylopsin.	Steapsin.	Trypsin.	
			Group VI—Continued							
29	Mr. S.	Thrombo-angiitis	......	Jan. 31, 1918 Fasting	3 c.c.; watery; clear	..	0	0	0	
				1 h. a. b.	2 c.c.; yellowish	..	4	2	0	Rennet +.
				1 h. a. b.	½ c.c.; watery	N.	2	3	0	
				1½ h. a. b.	½ c.c.; watery	..	0	0	0	
30	Mr. B.	Thrombo-angiitis obliterans	......	Jan. 29, 1918 ½ h. a. b.	6 c.c.; yellow; slightly turbid	25	5	1½	0	
				1 h. a. b.	3 c.c.; yellow; green; turbid	20	10	2	4	
				1½ h. a. b.	8 c.c.; gold; yellow; turbid	25	5	1	2	
				2 h. a. b.	3 c.c.; yellowish green; turbid	15	6	1	2	
31	Mr. M.	Thrombo-angiitis obliterans	......	Jan. 30, 1918 Fasting	½ c.c.; yellow; clear	Alk	0	½	½	
				½ h. a. b.	3 c.c.; yellow; clear	10	0	Tr.	Tr.	
				1 h. a. b.	3 c.c.; yellow; clear	10	0	0	0	
				1½ h. a. b.	8 c.c.; yellow; clear	20	0	½	½	
				2 h. a. b.	3 c.c.; yellow; clear	−5	0	½	½	
32	Mr. K.	Thrombo-angiitis obliterans	......	Mar. 27, 1918 Fasting	8 c.c.; whitish; turbid; no bile	5	6	8	1	
				½ h. a. b.	10 c.c.; yellow; greenish; turbid	55	11	5	6	
				1 h. a. b.	3 c.c.; light yellow; turbid	15	9	1	4	
				1½ h. a. b.	5 c.c.; whitish; turbid; no bile	15	9	5	1	
				2 h. a. b.	7 c.c.; whitish; turbid; no bile	20	7	2	2	

h. a. b. = hour(s) after bouillon.

Group V comprises 3 cases of achylia, 2 benign and 1 complicated with cancer of the stomach. The alkalinity fluctuates between 20 and 40 in the 2 benign cases and between 50 and 60 in the cancer case. The strength of the ferments is highest between half an hour and one hour after the bouillon test meal.

Group VI. Six cases of thrombo-angiitis obliterans, one of which was complicated with diabetes mellitus, were likewise examined. They were all patients of Dr. Willy Meyer and were treated by duodenal instillation of Ringer's solution. I am greatly indebted to Dr. Willy Meyer for permission to examine their pancreatic function. The alkalinity was, on an average, somewhat lower than normal, fluctuating between 10 and 24; once it was 5 and once 55.

In 3 of the 6 cases the ferment activity was at times greatly reduced (Cohen, Scherr, Metloff), the steapsin ferment showing the greatest variations.

Epicrisis. The grouping of the table was arranged according to gastric secretion in order to see whether the latter has any bearing on the alkalinity curve. *A priori,* one would expect a lowered alkalinity in cases of hyperchlorhydria and conversely an increased alkalinity in cases of subacidity. This seems to be true in a certain measure, but not constantly so. It seems there are other factors besides gastric secretion which play a part in regulating the degree of alkalinity of the duodenal contents. Chief among these are the pancreatic and duodenal juices and the bile. Each one of these is liable to have its own peculiarities and show alterations in disease.

It appeared worth while to look at the different types of alkalinity curves found, regardless of gastric juice or any disease present.

The accompanying types of alkalinity curves can be easily discerned.

Type 1 (Chart I). Decrease of alkalinity during the first half hour after the bouillon, then a steady increase.

Type 2 (Chart III). Increase of alkalinity between one-half and one hour after the bouillon, then slight decrease. Chart II belongs to Type 1, Chart IV belongs to Type 2.

Type 3 (Chart V). Increase of alkalinity during first half-hour after the bouillon, then slight decrease up to one hour, then again increase to one and a half hours, thereupon again a decrease.

Type 4 (Chart VI). There is first a steady increase of alkalinity up to one and a half hours after the bouillon test meal then an abrupt descent of the curve, so that at two hours after the bouillon the contents are acid instead of alkaline.

Of the three ferments each shows its individual peculiarities; the strength of one ferment cannot be gauged by that of the other. It is possible to ascertain the strength of each ferment at the different periods after the test meal and express it in the form of a curve. But each one (A. S. T.) has its own curve.

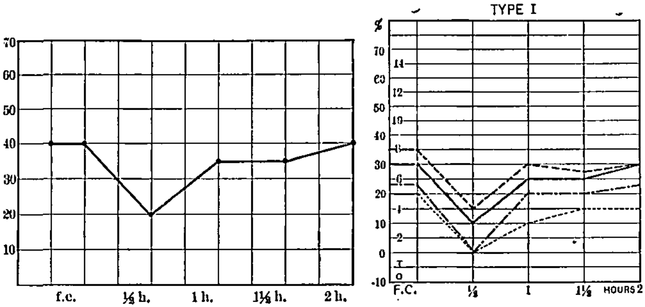

CHART I.—Case of Miss R. M. (No. 1). Alkalinity curve, Type I.

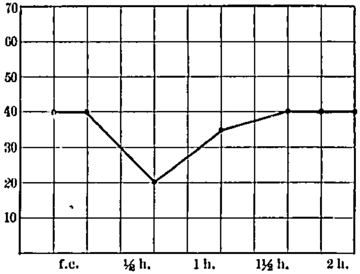

CHART II.—Case of Mrs. J. T. P. (No. 8). Alkalinity curve, Type I.

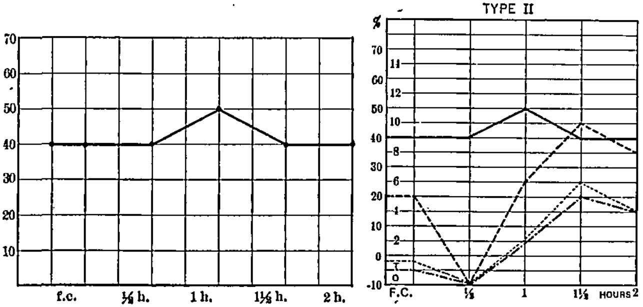

CHART III.—Case of Mr. J. M. W. (No. 5). Alkalinity curve, Type II.

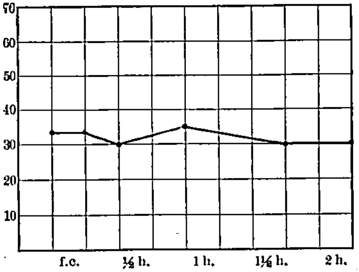

CHART IV.—Case of Mrs. J. D. (No. 19). Alkalinity curve, Type II.

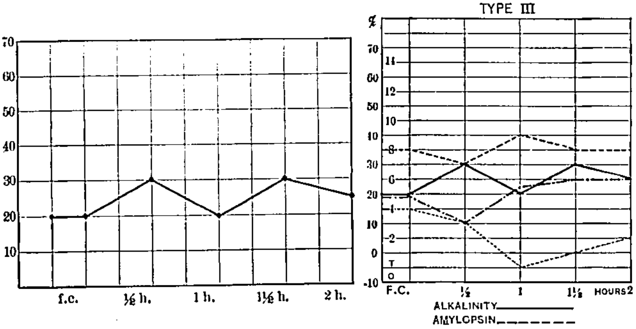

CHART V.—Case of Mrs. L. M. (No. 11). Alkalinity curve, Type III.

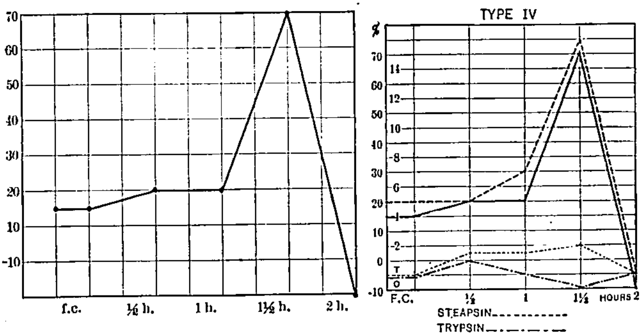

CHART VI.—Case of Mrs. A. L. M. (No. 23). Alkaainity curve, Type IV.

OBJECT OF DETERMINING THE ALKALINITY. The pancreatic secretions act best in an alkaline medium. The reversion of the acid gastric contents into an alkaline mixture is an important function of the duodenum and its neighboring organs.

It can be easily imagined that in pathological conditions this harmonious work in having the right medium will be lacking. We may then have conditions in which the degree of alkalinity is too high, or again too low, *i. e.*, diminished alkalinity or slight acidity.

AT WHAT TIME IS IT BEST TO EXAMINE THE DUODENAL CONTENTS? The fasting duodenal contents usually consist of some pancreatic secretion and bile, perhaps also duodenal secretion. The pancreatic juice this time is generally weak in ferment activity and gastric contents are not admixed therein.

The duodenal contents one to one and a half hours after the bouillon test meal represent a chyle embracing the pancreatic juice at the height of activity, bile, duodenal secretion and an admixture of gastric chyme.

To facilitate the diagnosis of liver and gall-bladder lesions it appears that the examinations in the fasting state will give the best results. For here the investigation of the bile, in as pure a state as we can obtain it, will form the main object.

In pancreatic affections, also in all conditions in which the principal part of the digestive act should be investigated, it will be best to examine the duodenal contents one to one and a half hours after the test meal. The height of the pancreatic activity found at this moment and also the reversion of the admixed gastric chyme from an acid to an alkaline medium, which is a very important function of the duodenum, make this time best suited for the above purposes.

CERTAIN ASPECTS OF THE CLINICAL VALUE OF THE ESTIMATION OF KIDNEY FUNCTION.[1]

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DURING this past year information upon several points in kidney function has accumulated in this clinic, which we believe to be of sufficient interest to warrant its publication. The material upon each of the questions presented is somewhat limited, but we hope that it will be of value to those engaged in similar work.

The necessity of determining kidney function by a combined

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[1] This work was made possible by a grant from the James Cooper Fund of McGill University.